



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

H/A

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/700,588

11/05/2003

Ziv Reich

26749

6409

7590
Martin D. Moynihan
PRTSI, Inc.
P. O. Box 16446
Arlington, VA 22215

09/13/2007

EXAMINER

DOLE, TIMOTHY J

ART UNIT

PAPER NUMBER

2858

MAIL DATE

DELIVERY MODE

09/13/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/700,588	Applicant(s) REICH ET AL.	
	Examiner Timothy J. Dole	Art Unit 2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent-term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-151 is/are pending in the application.
- 4a) Of the above claim(s) 1-35 and 54-133 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 36-53 and 134-151 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>4/5/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Species C, claims 36-53 and 134-151, in the reply filed on July 5, 2007 is acknowledged. Because applicant did not distinctly and specifically point out any errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 36-43, 49-53, 134-141 and 147-151 are rejected under 35 U.S.C. 102(b) as being anticipated by Reich et al. (US 2002/0118005).

Referring to claims 36 and 134, Reich et al. discloses a device and method for monitoring fluid locomotion (abstract) in a fluid channel (fig. 3 (32)), the device comprising: a capacitor (fig. 3, capacitor formed by (12) and (14)), being formed on or integrated with the fluid channel (paragraph [0104]) and having a variable cross-sectional area (paragraph [0105]); and electrical contacts (fig. 1 (15)), connecting said capacitor to a capacitance measuring device (fig. 1 (18)); said variable cross-sectional area is selected so that a change in a capacitance of said capacitor represents a location of the fluid in the fluid channel (paragraph [0102]).

Referring to claims 37 and 135, Reich et al. discloses the device and method as claimed wherein the fluid is selected from the group consisting of water, a body fluid, a bacterial cell suspension, a protein solution, an antibody solution, a nucleic acid solution and ink (paragraph [0108]).

Referring to claims 38 and 136, Reich et al. discloses the device and method as claimed wherein said capacitor is positioned in proximity to an edge of the fluid channel (fig. 6), so as to monitor a rate of drop formation near said edge (paragraphs [0108]).

Referring to claims 39 and 137, Reich et al. discloses the device and method as claimed wherein said capacitor comprises two conductive plates (fig. 2a (12) and (14)) defining an inter-plate volume (fig. 2a) having a longitudinal axis (fig. 2a (13)), said conductive plates having constant transverse dimensions along said longitudinal axis (fig. 2a and paragraph [0038]).

Referring to claims 40 and 138, Reich et al. discloses the device and method as claimed wherein said capacitor comprises two conductive plates (fig. 2b (12) and (14)) defining an inter-plate volume (fig. 2b) having a longitudinal axis (fig. 2b (13)), said conductive plates having a variable transverse dimensions along said longitudinal axis (fig. 2b and paragraph [0100]).

Referring to claims 41 and 139, Reich et al. discloses the device and method as claimed wherein the fluid channel is a capillary (fig. 3 (32)).

Referring to claims 42 and 140, Reich et al. discloses the device and method as claimed wherein said capacitor comprises two conductive plates (fig. 3 (12) and (14)) engaging opposite faces of said capillary (fig. 3).

Referring to claims 43 and 141, Reich et al. discloses the device and method as claimed wherein said capillary has a profile selected from the group consisting of a polygonal profile, a circular profile, an ellipsoidal profile and an irregular pattern profile (paragraph [0104]).

Referring to claims 49-51 and 147-149, Reich et al. discloses the device and method as claimed wherein a size of said capacitor is in a nanometer, millimeter and centimeter scale (paragraph [0131]). It should be noted that Reich et al. discloses that the capacitor in the example is 100 nm long (paragraph [0131]), which is equivalent to .0001 mm and .00001 cm, and is therefore considered to be part of the millimeter and centimeter scales.

Referring to claims 52 and 150, Reich et al. discloses the device and method as claimed wherein said capacitance measuring device is selected from the group consisting of a capacitance meter and a capacitance bridge (paragraph [0102]).

Referring to claims 53 and 151, Reich et al. discloses the device and method as claimed wherein said capacitance measuring device is configured and designed to allow measuring of capacitance at a resolution of less than about 10% of a total capacitance of said capacitor (paragraph [0132]).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 44, 45, 142 and 143 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reich et al. (shown above) in view of Wang et al. (US 6,107,626).

Referring to claims 44, 45, 142 and 143, Reich et al. discloses the device and method as claimed except wherein the fluid channel is an HPLC column and said capacitor comprises two conductive plates engaging opposite faces of said HPLC column.

Wang et al. discloses a fluid channel (fig. 2B (15')) with a capacitor (fig. 2B (20')) wherein the fluid channel is an HPLC column (column 15, lines 1-4) and said capacitor (fig. 2B (20')) comprises two conductive plates (fig. 2B (18') and (22')) engaging opposite faces of said HPLC column (fig. 2B).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the HPLC column of Jorgenson et al. as the fluid channel of Reich et al. for the purpose of providing improved, highly-sensitive analysis of the fluid in the channel (column 15, lines 1-6).

6. Claims 46-48 and 144-146 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reich et al. (shown above) in view of Jorgenson et al. (US 2002/0092363).

Referring to claims 46-48 and 144-146, Reich et al. discloses the device and method as claimed except wherein the fluid channel is a microchannel of a microfluidic device; said capacitor comprises two conductive plates engaging opposite walls of said microchannel and said microfluidic device is selected from the group consisting of a drop ejector, a droplet microswitch, an extracellular electrode, a multi electrode array, a lab-on-chip device and a drug delivery microdevice.

Jorgenson et al. discloses a fluid channel (fig. 3 (46D)) with a capacitor (fig. 3 (16A) and (16B)), wherein the fluid channel (fig. 3 (46D)) is a microchannel of a microfluidic device (paragraph [0072]-[0073]); said capacitor comprises two conductive plates (fig. 3 (16A) and (16B)) engaging opposite walls of said microchannel (fig. 3) and said microfluidic device is selected from the group consisting of a drop ejector, a droplet microswitch, an extracellular electrode, a multi electrode array, a lab-on-chip device (paragraph [0072]) and a drug delivery microdevice.

Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the microfluidic device of Jorgenson et al. as the fluid channel of Reich et al. for the purpose of providing a device further suitable for performing chemical separations (paragraph [0072]).

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to show the state of the art with respect to monitoring fluid in a fluid channel.

USPN 6,562,012 to Brown et al.: This patent shows an apparatus for measuring drop size in a chamber by passing a drop between capacitive plates.

USPN 4,105,028 to Sadlier et al.: This patent shows an apparatus for controlling a drop rate when a drop is detected between opposing electrodes.

USPN 3,545,271 to Amir et al.: This patent shows an apparatus for capacitively detecting a liquid drop in a drip chamber.

Conclusion

Art Unit: 2858

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J. Dole whose telephone number is (571) 272-2229. The examiner can normally be reached on Mon. thru Fri. from 8:00 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Hirshfeld can be reached on (571) 272-2168. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Timothy J. Dole

A handwritten signature in black ink, appearing to read 'TJ Dole', with a long horizontal stroke extending to the right.